



NAVY AND MARINE CORPS PUBLIC HEALTH CENTER
PREVENTION AND PROTECTION START HERE

Drinking Water Medical Surveillance



U.S. Navy photo by Petty Officer 1st Class Eric Dietrich

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Environmental Health Officer, NMCPHC

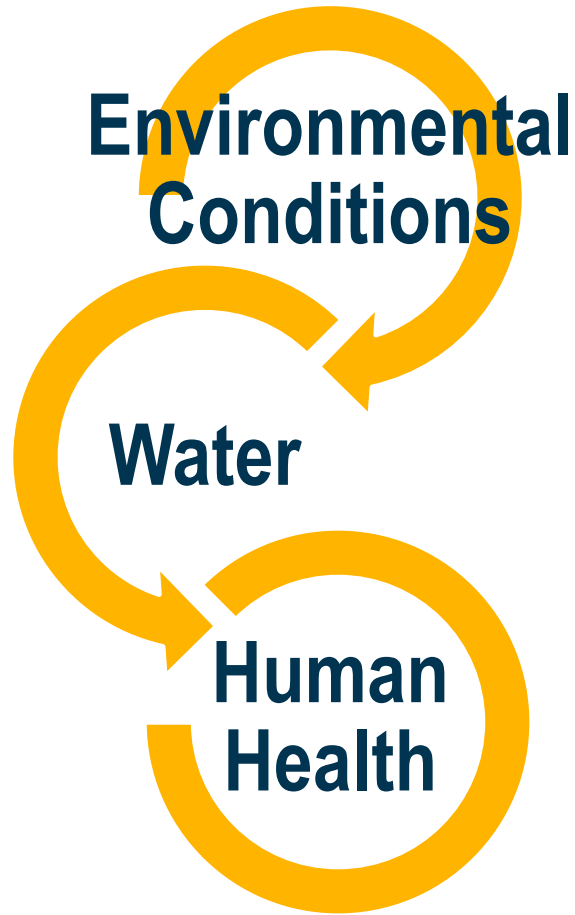
Announcements

- Register for the Monthly Disease Surveillance Trainings to receive CMEs/CNEs:
- 1. Log-on or Request log-on ID/password:
<https://tiny.army.mil/r/zB8A/CME>
- 2. Register for Epi-Tech Surveillance Training:
<https://tiny.army.mil/r/dVrGO/EpiTechFY14>
- Communicate with your Service surveillance hub to ensure you get information on future trainings: POC info in chat box
- Confirm attendance for today's training:
- Enter your name/service into chat box or email your Service hub
- You will receive a confirmation email within the next 48 hours
- If you do not receive this email, please contact us
- Please put your phones on mute when not speaking
- We will be taking attendance on the phone lines as well for future planning

Objectives

- Describe drinking water medical surveillance
- Discuss the importance of drinking water medical surveillance
- Identify factors that trigger drinking water testing
- Understand the key factors involved in conducting the testing and evaluation of drinking water

Drinking water



Potential challenges

- Pathogen resistance
- Contaminants
- Inadequate infrastructure
- Emergency related events

Safe Drinking Water Act (SDWA)

42 U.S.C. §300f et seq

- Protect public health by regulating the nation's public drinking water supply
- Authorizes the U.S. Environmental Protection Agency to set national health-based standards for drinking water
 - National Primary Drinking Water Regulations
- Applies to every public water system in the U.S.

Continental U.S. Navy, Air Force, and Army drinking water policies



OPNAVINST 5090.1C, Environmental Readiness Program Manual

- BUMEDINST 6240.10 series, Standards for Potable Water
- NAVMED P-5010, Chapter 5, Potable Water Ashore
- CNIC 5090.1, CNIC 5090.2, CNIC 5090.3



AFI32-7001, Environmental Management

- AFI32-1067, Water Systems
- AFI48-144, Drinking Water Surveillance Program



AR 420-1, Army Facilities Management

- AR 40-5, Preventive Medicine
- TB MED 576

Navy and Marine Corps Drinking Water Policy and Guidance

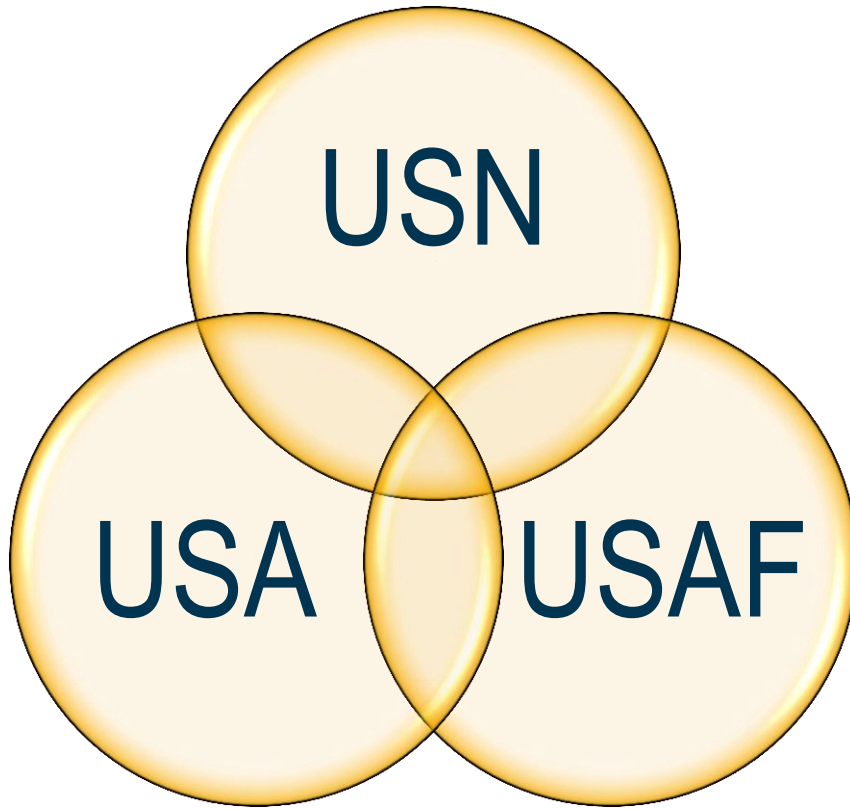
CONUS	OCONUS	AFLOAT	DEPLOYMENT
<ul style="list-style-type: none">• OPNAVINST 5090.1 series• MCO P5090.2A• BUMEDINST 6240.10A• NAVMED P-5010-5	<ul style="list-style-type: none">• DoD 4715.05-G, OEBGD• Final Governing Standards (country specific)• CNIC 5090.1• CNIC 5090.2• CNIC 5090.3• Memorandum for Navy Overseas IWQB and RWQB• Drinking Water Treatment Chemical Standards for U.S. Navy Installations Overseas• BUMEDINST 6240.10A• NAVMED P-5010-5	<ul style="list-style-type: none">• BUMEDINST 6240.10A• NAVMED P-5010-6• COMNAVAIRFORINST 6000.1, (Aircraft carriers of the Naval Air Force)• COMNAVSURFORINST 6000.1, (Naval Surface Forces)• COMSUBFORINST 6000.2, Submarine Medical)	<ul style="list-style-type: none">• NAVMED P-5010-10

Compliance Monitoring vs. Surveillance*

	Compliance Monitoring	Surveillance
Who	Water system owners (public works, engineering)	Military “public health” personnel
What	Mircroorganisms, disinfectants, disinfection byproducts, inorganic chemicals, organic chemicals, radionuclides	<ul style="list-style-type: none"> - Review or inspection of records - Bacteriological testing
When	Based on type of contaminant, the type of source water used, and population service	Ongoing and during outbreak investigations
Where	Installation distribution system	Installation distribution system
Why	Assure compliance with drinking water laws and regulations in order to protect human health and the environment	Contributes to the protection of public health through detection of risks and identifying a source of an outbreak of a waterborne disease
How	EPA or State certified drinking water laboratory	EPA-approved kits and record reviews

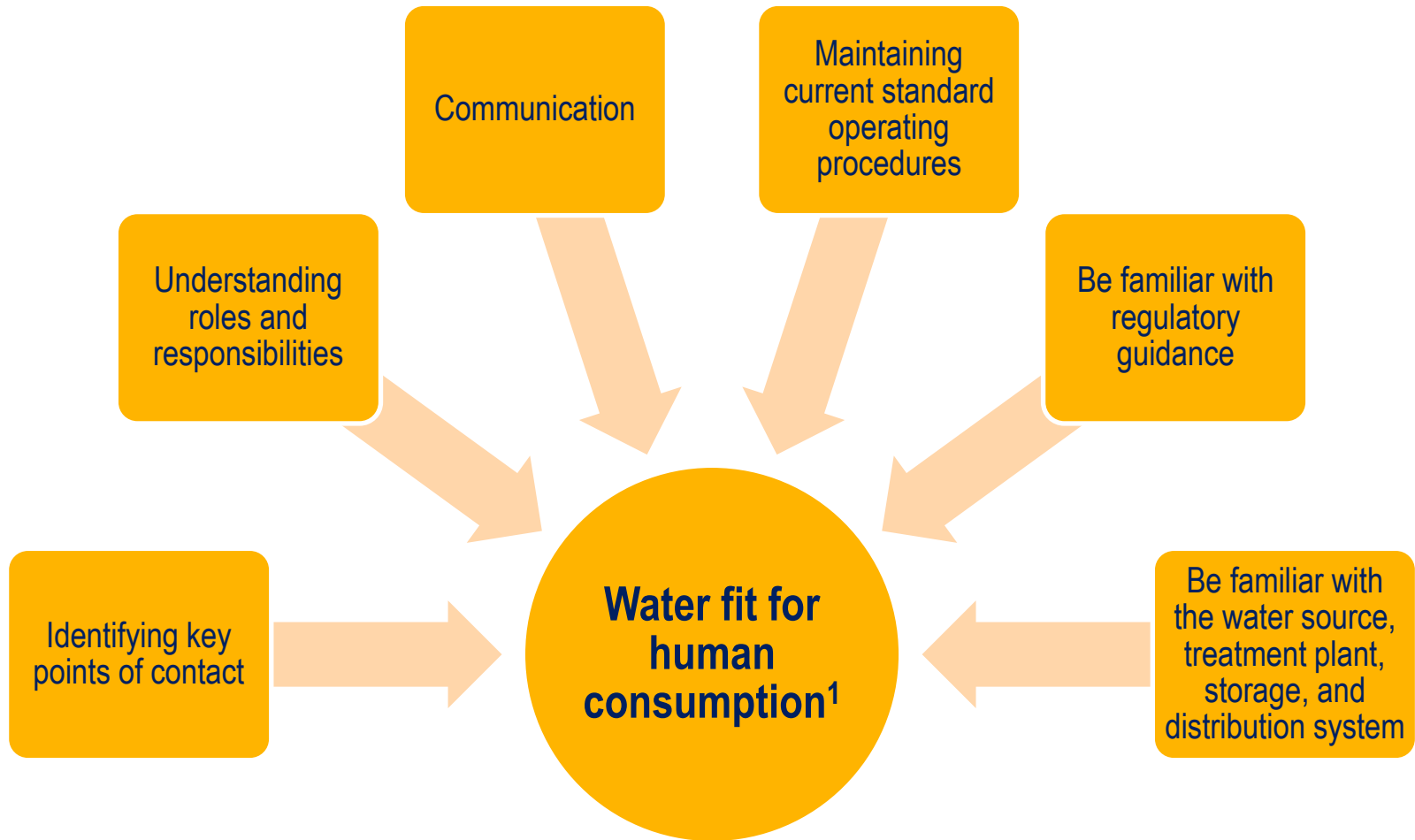
*Medical surveillance for drinking water is executed differently across the services

Preventive Medicine's role in drinking water



- Review records
- Test drinking water, as appropriate
- Ensure surveys or assessments are completed
- Work with the water system owners and base environmental staff
- Respond to waterborne disease outbreaks

Establishing a medical drinking water surveillance program



1. Definition of a Public Water System. (2012, March 6). *Home*. Retrieved May 14, 2014, from <http://water.epa.gov/infrastructure/drinkingwater/pws/pwsdef2.cfm>

Violations of drinking water standards

- Requires public notification² by the water system operators
 - ✓ Includes waterborne disease outbreak or other waterborne emergency
- Three tiers of PN:
 - Tier 1: Serious adverse effects on human health as a result of short-term exposure (24 hours)
 - Tier 2: Serious, but not immediate, adverse effects on human health (within 30 days)
 - Tier 3: Violations and situations not included in Tier 1 and Tier 2 (up to a year)
- EPA Revised Public Notification Handbook³

2. Public Notification (PN). (2012, March 6). *Home*. Retrieved May 5, 2014, from <http://water.epa.gov/lawsregs/rulesregs/sdwa/publicnotification/index.cfm>

3. <http://water.epa.gov/lawsregs/rulesregs/sdwa/publicnotification/upload/PNrevisedPNHandbookMarch2010.pdf>

Waterborne disease outbreak

- Preventive medicine's role with testing drinking water
 - ✓ Assess the possibility a waterborne outbreak is occurring
 - ✓ Assess the possibility the water supply is contaminated
- Coordinate with water system owners and local public health department
- Investigate the outbreak
- Report via Disease Reporting System internet per BUMEDINST 6220.12 series

Waterborne disease outbreak

40 CFR 141.2

Waterborne disease outbreak means the significant occurrence of acute infectious illness, epidemiologically associated with the ingestion of water from a public water system which is deficient in treatment, as determined by the appropriate local or State agency.

Waterborne Disease and Outbreak Surveillance System through the electronic National Outbreak Reporting System

- 1) Two or more persons must be linked epidemiologically by time, location of water exposure, and illness characteristics; and
- 2) The epidemiological evidence must implicate water as the probably source of illness

Military Reporting Guidelines

- 1) BUMEDINST 6220.12 series, Medical Surveillance and Medical Event Reporting
- 2) NMCPHC TM 6220.12, Medical Surveillance and Reporting
- 3) AFI 48-105, Surveillance, Prevention, and Control of Diseases and Conditions of Public Health or Military Significance
- 4) **Armed Forces Reportable Medical Events Guidelines and Case Definitions**

CDC Surveillance for Waterborne Disease Outbreaks Associated with Drinking Water, U.S. 2009-2010⁴

Characteristics of drinking water outbreaks (N=33) and outbreak-related cases (N=1,040)

- Etiology
 - *Legionella* caused the majority of drinking water outbreaks and outbreak-associated (57.6%)
 - Non-*Legionella* bacteria caused the majority of illnesses (81.8%)
- Water system: Community water systems
- Water source: Ground water
- Predominant illness
 - Outbreaks: Acute respiratory illness (57.6%)
 - Cases: Acute gastrointestinal illness (92.6%)

Detecting an waterborne disease outbreak

BLUF: It's not easy!

- Epidemiologic evidence is generally more reliable than confirmation by microbiologic testing⁵.
- Different exposure risks (i.e., tap water consumption, water source, population at risk)
- Multi-disciplinary team (clinicians, infection control practitioners, public works engineers and facilities, nurses, preventive medicine, local public health)

5. Tostmann A, Bousema T, Oliver I. Investigation of outbreaks complicated by universal exposure. Emerg Infect Dis 2012;18:1717–22

Waterborne disease outbreaks: EXAMPLES

- 1993 *Cryptosporidium* outbreak in Milwaukee⁶
 - More than 400,000 people affected
 - Inadequate water-quality standards
 - Viral gastroenteritis or “intestinal flu” without further investigation
 - Outbreak associated illness estimated at \$96.2 million⁷

- Legionnaires’ disease outbreak at the VA Pittsburgh Healthcare System⁸
 - Improper remediation action (flushing of all hot water distal outlets)
 - Failure to follow specific clinical SOPs
 - Poor communication and coordination: infection prevention team and facility management service staff

6. Mac Kenzie, M.D., W. R., Hoxie, M.S, N. J., Proctor, Ph.D., M.P.H, M. E., Gradus, Ph.D, M. S., Blair, M.S., R.N., K. A., Peterson, M.D., M.P.H, D. E., et al. A Massive Outbreak in Milwaukee of *Cryptosporidium* Infection Transmitted Through the Pubic Water Supply. *New England Journal of Medicine*, 331, 161-167.

7. Corso PS, Kramer MH, Blair KA, Addiss DG, Davis JP, Haddix AC. Cost of illness in the 1993 Waterborne *Cryptosporidium* outbreak, Milwaukee, Wisconsin. *Emerg Infect Dis* [serial online] 2003 Apr [date cited]. Available from: URL: <http://wwwnc.cdc.gov/eid/article/9/4/02-0417.htm>

8. Healthcare Inspection Legionnaires' Disease at the VA Pittsburgh Healthcare System Pittsburgh, Pennsylvania. (2013, April 23). . Retrieved May 14, 2014, from <http://www.va.gov/oig/pubs/VAOIG-13-00994-180.pdf>

Investigating a waterborne disease outbreak:

Purpose

- 1) Prevent further transmission
- 2) Identify the source of exposure
- 3) Prevent further exposures and limit outbreaks
- 4) Identify hazards or gaps in the water safety system

Investigating a waterborne disease outbreak: Responsibilities

- Health care providers: immediately notify preventive medicine
- Public health: report potential outbreaks in DRSi and contact local public health department
 - Notify medical chain of command of a potential outbreak
 - Prepare risk communication plan
- Contact Service surveillance hubs or your cognizant NEPMU to assist with investigating and coordinate with the local health department.

Investigating a waterborne disease outbreak:

Investigation

- Characterize the outbreak
- Confirm the existence of an outbreak
- Collect specimens and arrange for appropriate clinical laboratory testing
- Case definition
- Conduct an environmental investigation
- Implement control measures

Summary: The Drinking Water Program

- Understand the difference between medical surveillance and compliance monitoring
- Drinking water medical surveillance includes administrative actions as well as being able to detect and respond to a waterborne disease outbreak
- Water testing is complex
- Request assistance to conduct an adequate waterborne disease investigation and prepare a risk communication plan

Questions/Service POCs

- **Army: USAPHC – Disease Epidemiology Program**
Aberdeen Proving Ground – MD
Comm: (410) 436-7605 DSN: 584-7605
usaphc.disease.epidemiology@us.army.mil
- **Navy: Contact your cognizant NEPMU**
NEPMU2: COMM: (757) 950-6600; DSN: (312) 377-6600
Email: NEPMU2NorfolkThreatAssessment@med.navy.mil
NEPMU5: COMM: (619) 556-7070; DSN (312) 526-7070
Email: ThreatAssessment@med.navy.mil
NEPMU6: COMM: (808) 471-0237; DSN: (315) 471-0237
Email: NEPMU6ThreatAssessment@med.navy.mil
- **Air Force: Contact your MAJCOM PH or USAFSAM/PHR**
USAFSAM / PHR / Epidemiology Consult Service
Wright-Patterson AFB, Ohio
Comm: (937) 938-3207 DSN: 798-3207
episervices@wpafb.af.mil